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Proximate and Texture Profile Analysis of Gluten-Free Cookies Made from Black Glutinous Rice and Mung Bean Flour

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ABSTRACT
Cookies are one of the food product kinds that have been extensively studied as low-calorie and high-fiber foods. Non-gluten cookies (high fiber) could be made with black glutinous flour and mung bean flour. Black glutinous rice is a valuable ingredient to enhance dietary fiber and antioxidants in food products. The mung bean flour had significant levels of crude fiber (3.77%), iron (89.62 mg), and protein (18.42%). This substance was chosen because mung bean flour and black glutinous rice flour are gluten-free flour, and this research contributed to diversifying food beyond grains and cereal and analyzing that physicochemical profile. This study offers to determine the differences between the findings of proximate analysis and texture profile analysis in cookies made using mung bean flour and black glutinous rice flour. The composite of flour was made from mung black glutinous rice flour and mung bean (F1 = 0:100; F2 = 30:70; F3 = 70:30; F4 = 100:0). The experiment used a completely randomized design to compare the physicochemical and profile texture parameters of cookies. The result of this study is the highest proximate content in terms of protein is in F2, with a moisture content of 4.43%, ash content of 4.80%, fat content of 9.46%, and carbohydrate content of 73.32%, which is following the Indonesian National Standard (SNI) 01-2973-2022. The texture profile such as hardness 106.23 N, cohesiveness 0.405, springiness 0.84, gumminess 53.54, and chewiness 33.53 N.

KEYWORDS
Black glutinous rice; Cookies; Mung bean; Proximate; Texture profile

1. INTRODUCTION

Global demand for nutritious food products is rising quickly. These days, dietary fiber-enriched and sugar-free products are popular healthy foods [1]. Cookies are one of the food product kinds that have been extensively studied as low-calorie and high-fiber foods. This is because cookies have a long shelf life, are inexpensive to produce, and are enjoyed by people of all ages and backgrounds [2]. Cookies are well-liked confections with a distinctive flavor and texture, a lengthy shelf life, and a reasonably low cost [3]. They are well-liked treats that people of all ages eat throughout the world. Currently, limited studies have evaluated gluten-free flour substitution in cookies regarding both nutritional and sensory attributes. In this research, researchers diversified local raw materials gluten-free to produce cookies. Non-gluten cookies, which are high in nutritional fiber, could be made with black glutinous flour and mung bean flour. Black glutinous rice is a valuable ingredient to enhance dietary fiber and antioxidants in food products [4]. The idea of making cookies with composite flour is not new, and it has been the focus of several investigations. Making these cookies in addition to using black glutinous rice flour but also using mung bean flour. More than half of the world's population depends on rice as a staple diet, making it the second most widely grown

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crop after wheat [5]. Since it contributes to almost 90% of global output, rice is a staple food in many areas [6]. For the majority of countries in the world, particularly the nations of East and Southeast Asia, glutinous rice (*Oryza sativa* var. glutinosa) is just as important as conventional white rice.

Black, purple, red, and brown pigmented glutinous rice has attracted a lot of interest as a raw material for making commercial health food items and supplements because of its high phenolic, anthocyanin, and antioxidant content [7]. Each glutinous rice cultivar provides unique eating and quality features despite having a high concentration of amylopectin and a very low percentage of amylose. Variations in the quality of glutinous rice products are linked to several physicochemical characteristics, including rice starch gelatinization temperature, gel consistency, and alkali digestibility [8]. In addition to being gluten-free and high in carbohydrates, glutinous rice generally has higher concentrations of vitamins, minerals, and other nutrients, as well as a wealth of bioactive substances like flavonoids, vitamin E, and anthocyanins [4]. Ash content (1.19%), antioxidant activity (60.75%), amylose content (10.32%), and amylopectin content (89.67%) are the nutritional values that have been quantified. Compared to other rice types, glutinous rice has a lower concentration of amylose (0% to 2% dry basis) and a higher concentration of amylopectin in its grain starch composition [9], [10], [11]. Because glutinous rice has more starch than regular rice, it appears transparent and opaque white. There are two primary varieties of glutinous rice: indica and japonica [11]. Additionally, we looked at the nutritional qualities of several glutinous rice cultivars, such as red, black, and white glutinous rice. It was discovered that because black glutinous rice contains more phenolic, flavonoid, and anthocyanins than white and red glutinous rice, it has stronger antioxidant activity. The anthocyanin content of black glutinous rice has antioxidant properties and is suitable for health [12]. Glutinous rice is extensively available in Indonesia, with a yield of approximately 42,000 tons annually. The lack of glutinous rice contains around 78% carbohydrates [13]. Black glutinous rice is non-transparent, has a unique odor, and contains all or almost all amylopectin [8]. The nutritional content of black glutinous rice is energy 181 kcal, 4 g of protein, and 37.30 g of carbohydrate [4]. The low protein level of black glutinous rice flour can be solved by the inclusion of other flour, such as mung bean flour. Mung bean nutrition is beneficial for improving health because of its high protein level [14]. Mung bean is a potential source of protein due to its high protein content (20–30 %) [15]. Gluten, which is present in wheat flour, is bad for those with celiac disease. Their gluten intolerance may exacerbate dermatitis herpetiformis, gluten intolerance, sensitivity, and allergy [16], [17]. This substance was chosen because mung bean flour and black glutinous rice flour are gluten-free flour, and this research contributed to diversifying food beyond grains and cereal. Then, the texture profile and nutritional content of gluten-free cookies made from black glutinous rice and mung bean flour are analyzed following SNI.

2. MATERIALS AND METHODS

2.1. Materials

The materials used in this research are mung bean flour and black glutinous rice flour obtained from Toserba Karunia, margarine (Blue Band), sugar (Gulaku), skimmed milk (Indo Prima), baking powder (Koepo-koepoe), corn starch (Maizenaku), icing sugar (Claris), salt (Dolphin), and egg. The equipment used in this research is an oven (Philips), analytical balance (Ohaus Pioneer), blender (ehl5130 electric Philips), furnace (Muffle Furnace), desiccator, soxhlet, water bath (Memert WNB14 Ring), and texture analyzer (TX700).

2.2. Preparation of Cookies

The cookie production process begins with the mixing of margarine and sweetener for three minutes or until a creamy consistency was achieved. Subsequently, the eggs were incorporated and properly blended. The following process involves combining the dry ingredients, which consist of baking powder, salt, mung bean flour, black glutinous rice flour, and corn starch. The dough was combined with a spatula until it achieved homogeneity. The subsequent process was molding, followed by baking. The oven was preheated to 170 °C for 20 minutes before baking. The cookies were baked and thereafter allowed to cool at ambient temperature before analysis [18]. The formulation of the gluten-free cookies made from black glutinous rice flour and mung bean flour is presented in Table 1.

Table 1. Formulation of cookies gluten-free made from black glutinous rice flour and mung bean flour.

Ingredients	Formulation (%)				
	F1	F2	F3	F4	F5
Black glutinous rice flour	0	30	50	70	100
Mung bean flour	100	70	50	30	0
Skim Milk	10	10	10	10	10
Margarine	60	60	60	60	60
Baking powder	1	1	1	1	1
Corn starch	10	10	10	10	10
Icing sugar	20	20	20	20	20
Salt	1	1	1	1	1
Egg yolk	10	10	10	10	10

2.3. Moisture Content Analysis

Moisture content cookies were done based on the thermogravimetry method [19]. After three hours of drying at 105 °C in an oven, the porcelain crucibles were placed in a desiccator for one hour. An analytical balance was then used to weigh it. After that, 2.5 g of the sample was added to the crucible, which was then ovened for three hours at 105 °C. It was then put in a desiccator for an hour. The sample and crucible weights were measured. This analysis was carried out with three repetitions. The moisture content of cookies is calculated as equation (1), where a is the weight of the empty weighing bottle (g), b is the weight of the weighing bottle and sample (g), and c is the weight of the weighing bottle and sample after drying (g).

$$Moisture\ content\ (\%) = \frac{b-c}{b-a} \times 100\% \quad (1)$$

2.4. Ash Content Analysis

The porcelain crucibles are dried in a 105 °C oven for 3 hours and then placed in a desiccator for 1 hour. After that, the crucible was weighed using an analytical balance (a). Then, 2.5 g of the prepared sample were put into the crucible (b). The crucible and sample were dried in an electric furnace at 550 °C for four hours. The sample that had turned to ash was then placed in a desiccator for one hour. The weight of the cup and ash was determined (c) [20]. The ash content of the cookies can be calculated using equation (2).

$$Ash\ content\ (\%) = \frac{c-a}{b} \times 100\% \quad (2)$$

2.5. Protein content analysis

To obtain the protein content of the cookies, the samples were dried in an oven at 105 °C for 4 hours before grinding. Then, the sample was weighed up to 2 g on a beaker glass and placed in a destruction flask. After that, 7 g of K_2SO_4 and 5 g of $CuSO_4$ were added. Subsequently, 15 mL of concentrated H_2SO_4 was slowly added and allowed to stand for 10 minutes in an acid room. The digestion process was at 410 °C for 2 hours or until the solution was clear and then allowed to cool to room temperature before adding 50 mL of distilled water. As a container for the distillate, the erlenmeyer flask was filled with 25 mL of 4% H_3BO_3 solution containing an indicator. The ash holding the products of the digestion in the steam distillation device circuit has been installed. Then, 50 mL of $Na_2S_2O_3$ solution was added. Distillation was performed, and the distillate was collected in an erlenmeyer flask until it reached a minimum volume of 150 mL (the distillate will turn yellow). The distillate was titrated with standardized 0.1 N HCl until the color changed from green to neutral gray (natural grey) [20]. The protein content can be calculated using equation (3) where the VA was HCl volume for sample titration; VB was HCl volume for blank titration; N was the normality of the standard HCl used; 14.007 was atomic weight of hydrogen; 6.25 was protein conversion factor; and W was sample weight.

$$Protein\ content\ (\%) = \frac{(VA - VB) \times\ N\ HCl\ \times\ 14.007 \times 6.25 \times 100\%}{W\ \times 100} \tag{3}$$

2.6. Fat Content Analysis

The fat content of the cookies was analyzed using the soxhlet technique [20]. The samples were dried in an oven at 105 °C for 4 hours before grinding. The fat flask was dried in an oven at 105 °C for 30 minutes and cooled in a desiccator for 15 minutes before weighing (W2). Subsequently, the sample (5 g) was weighed and wrapped (W1). Then, the sample was inserted into the soxhlet and added with sufficient hexane solvent for 1.5 cycles. The extraction takes approximately 2 hours till the solvent returns through the siphon into the clear-colored fat ash. The distillation was utilized to separate the extracted fat and hexane from the fat flask. The separated fat with hexane was then heated in an oven at 105 °C for 1 hour. Afterward, the fat content was cooled in a desiccator for 15 minutes and weighed (W3). The heating process was repeated for 1 hour if the difference between the last extraction results and the previous weighing was less than 0.0002 g. The fat content of the cookies can be calculated using equation (4).

$$Fat\ content\ (\%) = \frac{W3 - W2}{W1} \times 100\% \tag{4}$$

2.7. Carbohydrate Content Analysis

Carbohydrate analysis was conducted according to carbohydrate by difference or carbohydrates through differences method [20]. The carbohydrate content of the cookies is calculated by equation (5).

$$Carbohydrate\ content\ (\%) = 100\% - (\text{moisture content} + \text{ash content} + \text{protein content} + \text{fat content}) \tag{5}$$

2.8. Texture Profile Analysis

Texture analysis was performed utilizing the Texture Profile Analyzer (TPA) and the texture analyzer principle [21]. The texture measurement procedure is to measure the sample's thickness (3–5 cm), length (5 cm), and width (5 cm). Then, the probe was installed, and the speed was set at 1 mm/s. Afterward, the probe was pressed twice with a force of 0.1 N and paused for 5 seconds. The sample was placed beneath the probe, the TPA parameters were selected according to the sample, and then the data analysis could be saved.

2.9. Experimental Design and Data Analysis

The experiment used a completely randomized design to compare the formulation of the cookies. The results are reported as mean ± SD. All experiments were repeated three times. A paired sample T-test with a 95% significance level ($p<0.05$) was used with IBM SPSS Statistics 29 software to calculate the difference between means.

3. RESULTS AND DISCUSSION

3.1. Moisture Content of Cookies

Water has a crucial function in the food system, affecting food freshness, stability, and durability, as well as microbial development. Moisture content in food can influence microbial growth, and each item presents a unique amount of food safety risk. Based on Table 2, the moisture content of cookies made from black glutinous rice flour and mung bean flour ranges from 4.43–4.74%. Statistical analysis showed that the different formulations showed a significant difference in the value of moisture content. The lowest moisture content was in F2, and the higher moisture content was in F3. According to SNI 01-2973-2022, the moisture level of cookies is limited to 5% in terms of quality requirements [22]. Another research indicates that variations in moisture content can also be controlled by protein concentration. The lower the moisture content, the longer the shelf life will be [13], [23], [24].

Table 2. Proximate results of cookies made from black glutinous rice flour and mung bean flour.

Sample	Moisture (%)	Ash (%)	Protein (%)	Fat (%)	Carbohydrate (%)
F1	$4.55^{ab} \pm 0.02$	$4.55^{a} \pm 0.04$	$50.83^{a} \pm 0.23$	$9.34^{a} \pm 0.29$	74.43 ± 0.21
F2	$4.43^{a} \pm 0.08$	$4.80^{b} \pm 0.14$	$60.83^{e} \pm 0.21$	$9.46^{a} \pm 0.13$	73.32 ± 0.23
F3	$4.73^{c} \pm 0.05$	$4.67^{ab} \pm 0.32$	$57.34^{d} \pm 0.32$	$10.69^{b} \pm 0.22$	75.65 ± 0.12
F4	$4.67^{ab} \pm 0.12$	$4.65^{ab} \pm 0.05$	$53.87^{b} \pm 0.36$	$10.89^{c} \pm 0.12$	74.72 ± 0.14
F5	$4.45^{a} \pm 0.28$	$4.56^{a} \pm 0.23$	$55.46^{c} \pm 0.04$	$9.57^{ab} \pm 0.23$	75.04 ± 0.02

The different letter notations (a, b, c, or d) in the same column indicate significant differences ($p<0.05$) between treatments.

3.2. Ash Content of Cookies

Ash content refers to the inorganic leftovers left over following the ignition/charring process or the complete oxidation of organic materials in food samples. The inorganic residue is mainly composed of minerals found in the diet. Ash content is one of the proximate analyses used to assess nutritional value [25]. Based on Table 2, the ash content of cookies made from black glutinous rice flour and mung bean flour ranges from 4.55 to 4.80%. Statistical analysis showed that the different formulations showed a significant difference in the value of moisture content. The lowest ash content was in F1, which used black glutinous rice flour 0% and mung bean flour 100%, and the higher ash content was in F2, which added 30% black glutinous rice flour and 70% mung bean flour. In this research, ash content F1–F5 is seen to have the highest content of the cookies. Mung bean flour contains 223 mg calcium, 319 mg phosphorus, and 7.5 mg iron [26]. The nutrient content of 100 g of black glutinous rice has 4 g of protein, 1.2 g of fat, 37.3 g of carbohydrates, 0.3 g of fiber, 9 mg of calcium, 144 mg of phosphorus, 1.7 mg of iron, 0.21 mg of vitamin B1, and anthocyanins [11], [13]. Several factors can influence a meal's ash level, including the drying process, the kind of food, the temperature, and the amount of time spent drying. The ash content increases as the drying time and temperature increase. The combustion temperature is changed based on the substance to prevent its various parts from breaking or even evaporating at high temperatures [27].

3.3. Protein Content of Cookies

Protein is a nitrogen-containing food substance and is the most significant component after water in most body tissues. Consuming protein can help fulfill the need for nitrogen and amino acids for the synthesis of body proteins and other nitrogen-containing substances [28], [29]. Based on Table 2, the protein content of cookies made from black glutinous rice flour and mung bean flour ranges from 50.83 to 60.38%. Statistical analysis showed that the different formulations showed a significant difference in the value of protein content. The lowest protein content was in F4 and the higher protein content was in F2. Mung bean flour meets the minimum requirements of SNI 01-2973-2022 regarding the quality parameters of cookies, which is a minimum of 4.5% [30]. The increase in protein content might be due to the appreciable amount of protein present in mung bean flour [31]. Protein content is another aspect that affects moisture content. Protein content decreases as moisture content rises with the amount of mung bean flour added [32]. The amount of water lost increases with protein content. Roasting denaturates proteins, reducing their water storage and emulsification, leading them to coagulate. Proteins will be hydrophilic if the peptide chains contain some polar amino acids. Various groups inside protein molecules do not contain a pair of N or O atoms. The negatively charged N atom in the peptide chain attracts the positively charged H atoms in water. The bond between the N atom and the H atom of water produces hydrate compounds. The hydrates have ionic bonding properties, so it is not easy to evaporate. Cookies have at least 5% protein content, meeting SNI 2973:2011 quality criteria. Mung bean flour has 24.9 g of protein per 100 g [33].

3.4. Fat Content of Cookies

One of the structural elements of a food product is fat. Fats are glycerol esters, as well as fatty acids. Like carbs, fat is an energy source for the body and can have greater energy content than carbs and protein. Fat also functions as a source of flavor and gives a soft texture to the product [27]. Based on the research obtained, the fat content of cookies was 10.89% in F4, as seen in Table 2. The fat content of cookies made from black glutinous rice flour and mung bean flour ranges from 9.34 to 10.89%. Statistical analysis showed that the difference formulation showed a significant difference in the value of fat content. The lowest fat content was in F4, which used black glutinous rice flour 70% and mung bean flour 30%, and the higher fat content was in F2, which added 30% black glutinous rice flour and 70% mung bean flour. The fat content in 100 g of mung bean flour is 1.5 g [34]. Nutritional content per 100 g of black glutinous rice, it has 4 g of protein, 1.2 g of fat, 37.3 g of carbohydrates, 0.3 g of fiber, 9 mg of calcium, 144 mg of phosphorus, 1.7 mg of iron, 0.21 mg of vitamin B1, and anthocyanins [11], [13]. In addition, the fat content in these cookies is also produced from other ingredients such as egg yolks, margarine, and skimmed milk.

3.5. Carbohydrate Content of Cookies

The carbohydrate content value can be caused by other nutritional components such as protein, fat, moisture, and ash content when calculated using the by-difference method. If the value of different dietary components is high, the lower the carbohydrate content of a food product [35]. Based on Table 2, the carbohydrate content of cookies made from black glutinous rice flour and mung bean flour ranges from 73.32 to 75.65%. Statistical analysis showed that the different formulations showed a significant difference in the value of carbohydrate content. The lowest carbohydrate content was in F2, which used black glutinous rice flour 30% and mung bean flour 70%, and the higher carbohydrate content was in F4, which added 70% black glutinous rice flour and 30% mung bean flour. Other nutritional components influence carbohydrate content calculated by difference. The carbohydrate content of cookies has met the requirements of SNI 01-2793-1992 of at least 70%.

3.6. Texture Profile of Cookies

3.6.1. Hardness of Cookies

Hardness is one part of the texture profile with the principle of using the amount of force (N) that can break the sample. A product's texture develops denser as the hardness value increases. Another factor that is thought to affect the hardness value is starch retrogradation. There are two steps in the retrogradation of starch. The network of amylose molecules that forms as the paste cools down creates a new elastic gel, which is the initial stage of retrogradation, also known as short-term retrogradation. The initial hardness of a starch gel, as well as the stickiness and digestibility of processed food, are all determined by amylose retrogradation. The second phase of retrogradation (long-term retrogradation) is related to the recrystallization of the outer branches of amylopectin [36]. The result of the texture profile can be seen in Table 3. The hardness of cookies made from black glutinous rice flour and mung bean flour ranges from 47.72 to 112.16 N. The lowest hardness was in F5 and the higher hardness content was in F1.

Table 3. Texture profile of cookies made from black glutinous rice flour and mung bean flour.

Sample	Hardness (N)	Cohesiveness	Springiness	Gumminess	Chewiness (N)
F1	$112.16^{c} \pm 0.15$	$0.39^{a} \pm 0.04$	$0.83^{a} \pm 0.13$	$24.02^{a} \pm 0.07$	$14.03^{a} \pm 0.02$
F2	$106.23^{b} \pm 0.12$	$0.41^{b} \pm 0.17$	$0.84^{a} \pm 0.24$	$53.54^{b} \pm 0.04$	$33.53^{b} \pm 0.02$
F3	$103.72^{b} \pm 0.04$	$0.45^{b} \pm 0.19$	$0.84^{a} \pm 0.07$	$53.18^{b} \pm 0.08$	$36.69^{b} \pm 0.02$
F4	$78.35^{b} \pm 0.02$	$0.45^{c} \pm 0.12$	$0.85^{a} \pm 0.05$	$54.23^{b} \pm 0.24$	$42.84^{c} \pm 0.02$
F5	$47.72^{a} \pm 0.05$	$0.38^{a} \pm 0.14$	$0.84^{a} \pm 0.02$	$55.46^{b} \pm 0.23$	$45.93^{c} \pm 0.02$

The different letter notations (a, b, c, or d) in the same column indicate significant differences ($p<0.05$) between treatments.

Mung bean flour contains protein, which may increase the protein level of cookies. High protein content can increase product hardness by producing an element with a granule surface, resulting in decreased viscosity and contacting the granule's surface, which reduces viscosity and increases hardness

[37]. The substituting starch for protein reduced the gel hardness of starch-protein compositions, possibly due to a decrease in amylose content. Because the system's amylose content plays a key part in hardness determination, a reduction in amylose content facilitates lower firmness and weakens the gel structure [36], [38].

3.6.2. Cohesiveness of Cookies

Amylose and amylopectin levels interact with tapioca starch, which interacts well with water and proteins. Cohesiveness refers to the amount of energy required to sustain food deformation. Amylose rearrangement is a key factor in starch gel cohesiveness. A completely elastic material would have a cohesiveness of one, any plastic deformation or disintegration would result in a value less than one. Cohesiveness is a measure of inelasticity or dissipation that characterizes the loss of integrity of the sample [36]. Based on Table 3, the cohesiveness of cookies made from black glutinous rice flour and mung bean flour ranges from 0.38–0.45. The lowest hardness was in F5, which used black glutinous rice flour 100% and mung bean flour 0%, and the highest hardness content was in F3, which added 70% black glutinous rice flour and 30% mung bean flour. Cohesiveness can also be interpreted as interaction, the level of cohesiveness of food products, which is related to the binding power of starch in a product [36]. The cooking technique can influence the cohesiveness value, as can the amylose and amylopectin levels of starch [37].

3.6.3. Springiness of Cookies

A springiness value of one indicates a perfectly elastic response for which the sample returns to its original height. Springiness is one of the texture profile characteristics applied to measure the extent to which a sample can be restored to its original form. Based on Table 3, springiness cookies made from black glutinous rice flour and mung bean flour range from 0.83–0.85. The lowest springiness was in F1, which used black glutinous rice flour 0% and mung bean flour 100%, and the highest springiness content was in F4, which added 70% black glutinous rice flour and 30% mung bean flour. The high springiness obtained indicates a more elastic product as a result of the interaction between gelatinized starch and gluten in the dough. A decrease in gluten concentration in the sample reduces the ability to hold gas, resulting in decreased elasticity and springiness [39].

3.6.4. Gumminess of Cookies

Gumminess is the amount of energy needed to break down a semisolid food before swallowing [38]. Based on Table 3, gumminess cookies made from black glutinous rice flour and mung bean flour range from 24.03–55.95 N. The lowest hardness was in F1 and the higher gumminess content was in F5. A higher gumminess value indicates a more durable product texture. A greater gumminess score implies that the product is tough to crush. The gumminess value has a positive correlation with the hardness value of cookies because harder materials need more energy to chew [36].

3.6.5. Chewiness of Cookies

Chewiness is a measure of energy essential to chew a solid product until it is swallowable [36]. Based on Table 3, the chewiness of cookies made from black glutinous rice flour and mung bean flour ranges from 14.03–45.93 N. The lowest chewiness was in F1, which used black glutinous rice flour 0% and mung bean flour 100%, and the highest gumminess content was in F5, which added 100% black glutinous rice flour and 0% mung bean flour. The higher the gumminess and springiness scores, the more chewing power is required [37], [40].

4. CONCLUSION

The addition of black glutinous rice flour and mung bean flour altered the chemical characteristics and texture profile of the cookies. Variations in the addition of black rice flour and mung bean flour had an impact on the chemical characteristics and textural profile. The result of this study is that the highest proximate content in terms of protein is in F2, which follows SNI 01-2973-2022. The highest texture profile is also in F2. It can be said that the best cookie formulation is 30% black glutinous rice flour and 70% mung bean flour.

AUTHOR CONTRIBUTION

Soraya Kusuma Putri: Investigation, writing (original draft review & editing), supervision, conceptualization, funding acquisition. **Agus Setiyoko**: Writing (review & editing), formal analysis.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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